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EXAMINER				
SALVITTI, MICHAEL A				
ART UNIT		PAPER NUMBER		
1796				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/567,664

Applicant(s)

HERTH ET AL.

Examiner

MICHAEL A. SALVITTI

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claim 6 is objected to because of the following informalities: following the transitional phrase, Claim 6 has no subject. For the purposes of further examination, the claim will be examined as meaning: "...wherein the composition is copolymerized...". Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 1-20, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1: The ratio of the second to the first cationic polymer does not specify whether the ratio is on the basis of weight, mole fraction, or another unit of measurement. For the purposes of further examination, claim 1 will be examined on the basis of weight percent; Inventive polymer 1 has a weight ratio within the specified weight ratio.

Regarding claim 14: The ratio of the second to the first cationic polymer does not specify whether the ratio is on the basis of weight, mole fraction, or another unit of measurement. For the purposes of further examination, claim 14 will be examined on the basis of weight percent; Inventive polymer 1 has a weight ratio within the specified weight ratio.

Regarding claim 15: The moisture content (line 3) is unitless; as such this term is indefinite. For the purposes of further examination, the term will be treated as being weight percent, in accordance with the specification.

Regarding claims 2-13 and 16-20: These claims are dependent upon claims 1 and 14, and are rejected for failing to correct the deficiencies of claims 1 and 14.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

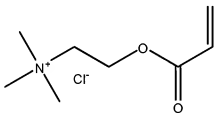
Claims 1-6 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by US 2002/0188040 to *Chen et al.*

Regarding claim 1: *Chen* teaches a water-soluble cationic polymer composition comprising at least two cationic polymers of different composition in the cationic groups (see Example 3, ¶ [0084]-[0086]; polyquaternium-28 and acryloyloxyethyl trimethylammonium chloride. While both of these contain trimethyl nitrogens, the fourth substituent, methacrylamidipropyl and acryloyloxyethyl, respectively, differentiates these compounds in the cationic group). The first cationic polymer is formed by radical polymerization of acryloyloxyethyl trimethylammonium chloride in the presence of a second cationic polymer (polyquaternium-7) in aqueous solution (¶ [0081]). This polymerization occurs via adiabatic gel polymerization; the temperature increase is due to the reaction

(adiabatic; ¶ [0086]). *Chen* does not state whether the composition is a gel; however 33% solids content is demonstrated. This percent solids is assumed to be a gel, as it is within the 10-60% solids range admitted in the instant specification (page 7 ¶ 2). The ratio of the first cationic polymer to the second cationic polymer is 30:56 by weight, which is within the recited range.

Regarding claims 2-3: *Chen* teaches that the molecular weight of the host polymer plus the intercalated polymer (analogous to the first polymer) has a molecular weight up to 10,000,000 (¶ [0042]). The host polymer (analogous to the second polymer) has a molecular weight of at least 1,000, which is under 1 million (¶ [0042]). By subtraction, the intercalated polymer can have a MW up to 9,999,000.

Regarding claim 4: Acryloyloxyethyl trimethyl ammonium chloride (Table 3, *Chen*) is a cationized ester of (meth)acrylic acid.



Regarding claim 5: Polyquaternium-28 (Table 3, *Chen*) is a copolymer of vinylpyrrolidone and methacrylamidopropyl trimethylammonium chloride (¶ [0043]); as such it is a cationized amide of methacrylic acid.

Regarding claim 6: Acrylamide (Table 3, *Chen*) is a further non-ionic water-soluble monomer.

Regarding claim 19: *Chen* teaches acryloyloxyethyl trimethyl ammonium chloride (Table 3, *Chen*), which is a quaternized dimethylaminopropyl acrylate.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

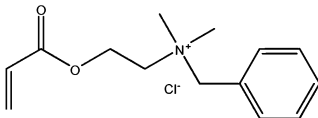
Claim 1, 4-9 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,225,395 to *Nzudie et al.* in view of US 2002/0188040 to *Chen et al.*

Claims 1, 4 and 19 are alternative rejections to the rejection over *Chen* as set forth above.

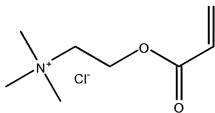
Regarding claim 1: *Nzudie* teaches a composition comprising two cationic polymers of different composition in the cationic groups: QUAT MC (acryloxyethyl trimethylammonium chloride, a compound containing 3 methyls on the quaternary nitrogen; col. 6, line 15) and QUAT BZ (acryloxyethyldimethylbenzylammonium chloride, a compound containing 2 methyls and a benzyl on the quaternary nitrogen; col. 6, line 39). The first cationic polymer (QUAT BZ) is formed by radical polymerization of monomer constituents in the presence of a second cationic polymer (QUAT MC) in an aqueous solution (col. 6, lines 30-51). The ratio of the second to the first cationic polymer is ~52:72 by weight (calculated from Example 1, col. 6, lines 34-40), which is encompassed by the range recited by instant claim 1.

Nzudie is silent regarding whether the polymerization can be completed in an adiabatic reaction. *Chen* teaches a polymerization which can be accomplished under adiabatic gel conditions (§ [0061]). These references are analogous art, in that they are drawn to the same field of endeavor, namely synthesis of water-soluble gel polymers containing first and second cationic monomers of different compositions in the cationic groups. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to polymerize the invention of *Nzudie* via adiabatic gel polymerization as taught by *Chen*, with the motivation of obtaining a polymer with a wide molecular weight range, thereby imparting unique properties to the resulting complex (*Chen* § [0063]).

Regarding claim 4: *Nzudie* the first cationic monomer is acryloxyethyltrimethylbenzylammonium chloride, a cationized ester of acrylic acid, containing a quaternary nitrogen:



Regarding claim 5: *Nzudie* teaches acryloxyethyl trimethylammonium chloride, a cationized ester of acrylic acid containing a quaternary nitrogen:



Regarding claim 6: *Nzudie* teaches copolymerization with water-soluble non-ionic monomers (acrylamide; col. 6, line 39).

Regarding claim 7: *Nzudie* teaches the first cationic polymer composed of about 50% by weight cationic monomers (140 parts styrene, 175 parts aqueous 80% QUAT MC; col. 6, lines 12-17).

Regarding claim 8: *Nzudie* teaches a composition wherein the second cationic polymer is 75% of the monomer composition (80%/89.5 parts QUAT BZ, 50%/46.5 parts acrylamide, 100%/5 parts butyl acrylate; col. 6, lines 38-41).

Regarding claim 9: *Nzudie* teaches the first cationic polymer having a lower charge density than the second cationic polymer; the first cationic polymer contains 50% by weight cationic polymer, as shown in the claim 7 rejection above, and the second cationic polymer has 75% cationic polymer, as shown in the claim 8 rejection above.

Regarding claims 16-18: *Nzudie* teaches that the compositions are used in flocculation (col. 2, line 32), purification of waste water purification (dispersion of charges and flocculation; col. 2, lines 32-34; compounds of this type are also disclosed for processing waste water in col. 1, line 17), and paper manufacture (paper retention; col. 2, line 32). Addition of this compound to these methods is an inherent process.

Regarding claim 19: *Nzudie* teaches quaternized dimethylaminoethyl acrylate (QUAT MC is quaternized dimethylaminoethyl acrylate; col. 6, line 15).

Regarding claim 20: *Nzudie* teaches quaternized diallyldimethylammonium chloride by name (col. 3, lines 15-18).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 11, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,225,395 to *Nzudie* in view of US 2002/0188040 to *Chen*, applied to claim 1 above, in view of U.S. Patent No. 4,857,610 to *Chmelir et al.*

Regarding claim 10: *Nzudie* teaches the of claim 1 above, a composition comprising two cationic polymers of different composition in the cationic groups: QUAT MC (acryloxyethyl trimethylammonium chloride, a compound containing 3 methyls on the quaternary nitrogen; col. 6, line 15) and QUAT BZ (acryloxyethyl dimethylbenzylammonium chloride, a compound containing 2 methyls and a benzyl on the quaternary nitrogen; col. 6, line 39). The first cationic polymer (QUAT BZ) is formed by radical polymerization of monomer constituents in the presence of a second cationic polymer (QUAT MC) in an aqueous solution (col. 6, lines 30-51). The ratio of the second to the first cationic polymer is ~52:72 (calculated from Example 1, col. 6, lines 34-40), which is encompassed by the range recited by instant claim 1.

The method of *Nzudie* entails adding a concentration of 20% solution of cationic monomer/polymers (see "dispersed polymer", Ex. 1, Table between col. 7-8), and

purging with an inert gas (flushing with nitrogen; col. 6, line 37). An initiator is added (ABAH; col. 6, line 41). *Nzudie* indicates that the starting temperature of the reaction is between 0-100°C (col. 5, line 62). At the time of the invention, it would have been obvious to a person having ordinary skill in the art to have a starting temperature between -10 to 25°C. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). See MPEP § 2144.05.

Nzudie is silent regarding whether the polymerization can be completed in an adiabatic reaction. *Chen* teaches a polymerization which can be accomplished under adiabatic gel conditions (¶ [0061]). These references are analogous art, in that they are drawn to the same field of endeavor, namely synthesis of water-soluble gel polymers containing first and second cationic monomers of different compositions in the cationic groups. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to polymerize the invention of *Nzudie* via adiabatic gel polymerization as taught by *Chen*, with the motivation of obtaining a polymer with a wide molecular weight range, thereby imparting unique properties to the resulting complex (*Chen* ¶ [0063]).

Nzudie is silent regarding mechanical size reduction and drying of the polymer gel. *Chmelir* teaches a process for preparing polymer gels via mechanical size

reduction (extrusion on a conveyor belt) and drying (col. 6, lines 65-68 of '610). These references are analogous art in that they are drawn to the same field of endeavor, namely processing gel polymers synthesized with water-soluble monomers. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to dry and mechanically reduce the size of the polymer, as demonstrated by *Chmelir* with the motivation of making a solid form of the invention disclosed by *Nzudie*.

Regarding claim 11: *Nzudie* teaches a temperature range of 0-100°C (col. 5, line 62) for the reaction temperature, overlapping the recited range. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191USPQ 90 (CCPA 1976). See MPEP § 2144.05.

Regarding claim 12: The concentration of the solution of monomers and cationic polymer in aqueous dispersion is 30.7% (20.2% + 10.5%, col. 6, line 51 of *Nzudie*).

Regarding claim 13: *Nzudie* is silent regarding using a polymerization initiator that can be activated by UV radiation. *Chmelir* teaches photoinitiators initiated by UV light (col. 4, lines 23-42 and Example 5, col. 14, lines 50-68). At the time of the invention, it would have been obvious to a person having ordinary skill in the art to use a UV-initiator with the invention of *Nzudie*. The motivation in doing so would be the enablement of the photopolymerization, allowing the composition to be utilized with equipment set up for this type of reaction, demonstrated by *Chmelir* (col. 11 line 64 through col. 12, line 14 and Figures 3 and 9, component 43).

Regarding claim 14: *Nzudie* is silent regarding polymerization carried out on a polymerization belt. *Chmelir* teaches polymerization via a polymerization belt. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to process the composition of *Nzudie* on a polymerization belt, with the motivation of producing the polymer in a continuous process with regard to improving the space-time yield of the process (col. 3, lines 1-7 of '610).

Regarding claim 15: *Nzudie* is silent regarding drying the polymer gel at 80-120°C after mechanical size reduction. *Chmelir* teaches drying after mechanical size reduction (col. 6, lines 65-68). At the time of the invention, it would have been obvious to a person having ordinary skill in the art to optimize the drying temperature in accordance with MPEP § 2144.05. The range between 80-120°C is a logical starting point, as a person of ordinary skill in the art know water has a boiling point of 100°C, which would facilitate the evaporation of water..

Response to Arguments

A) Corrections to the specification and claims have been noted. Any rejections and/or objections made in the previous Office Action and not repeated, are hereby withdrawn.

B) The double patenting rejection has been removed.

C) Applicant's arguments, see pages 11-14 of "Response to Office Action", filed 2/17/2009, with respect to the rejection(s) of claim(s) 1-9 and 16-20 under 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of US 2002/0188404 to *Chen*.

D) Applicant's arguments, see pages 15-19 of "Response to Office Action", with respect to the rejection(s) of claim(s) 10-15 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of 2002/0188404 to *Chen*.

E) Applicant's arguments that *Nzudie* teaches away from the recited invention have been fully considered but they are not persuasive. While *Nzudie* does state that a low viscosity is desirable (column 1, lines 43-50), this is only done with regard to the ease of application of the product, not the effectiveness of the product. As such, it would have been obvious to a person having ordinary skill to alter *Nzudie*'s final product, for example, by evaporation to reach a gel or powder form the the product.

Nzudie is still drawn to the same field of endeavor, and shares technical features in common with the instant application, as set forth in the action above.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL A. SALVITTI whose telephone number is (571)270-7341. The examiner can normally be reached on Monday-Thursday 8AM-7PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo/
Supervisory Patent Examiner, Art Unit 1796

/M. A. S./
Examiner, Art Unit 1796